

What is Claimed:

1. A nasal cannula for use with a positive air pressure machine providing a source of respiration gas at a pressure above atmospheric at a flow rate F , said cannula comprising:

first and second nasal inserts for insertion into a patient's nares; whereby the area of each insert and the area of the nare are essentially equal so that a positive air pressure seal is created between the nare and the insert;

a left delivery tube and a right delivery tube, each coupled to both of said nasal inserts, whereby each nasal insert communicates with both the left delivery tube and right delivery tube;

a coupler located remote from said nasal inserts for coupling said cannula to said source of respiration gas;

at least one bleed port positioned proximate a nasal insert communicating with said delivery tubes, directly open to atmospheric pressure.

2. The nasal cannula of claim 1 further comprising:

at least two tubular bleed ports each having an internal lumen;

each of said tubular bleed ports located directly in line with one of said nasal insert for preferentially intercepting expired gas during an exhalation, said bleed port having an characteristic bleed port diameter called BPD, and said bleed port separated by a distance called L .

3. The nasal cannula of claim 1 wherein:

said tubular bleed ports are located and sized to reduce the carbon dioxide content of inspired air to a value below approximately 0.5% carbon dioxide for the air inhaled from and retained by the delivery tubes.

5. The nasal cannula of claim 1 wherein:

said nasal inserts terminate in a compliant flange at their distal ends to conform to the nare of a patient.

6. The nasal cannula of claim 5 wherein:
each of said first or second nasal inserts has a characteristic length;
the length of either the first or second nasal insert are sufficiently long to allow an insert to move in the nasal passage until the cross section area of the nare and the cross section area of said nasal insert, are substantially the same, thereby forming a positive pressure seal between said nasal insert and said nare.
9. A nasal cannula for use with a positive air pressure system providing a flow F to the cannula, said nasal cannula comprising:
two nasal inserts for insertion into a patient's nares,
each insert having a flange member at its terminal end for sealing against said nare against the positive air pressures;
a right delivery tube and a left delivery tube meeting together proximate the nares forming plenum, having a plenum volume;
one or more bleed ports directly inline with said nasal insert providing unrestricted gas exchange with the environment; each bleed port having a characteristic diameter, selected depending on the plenum volume and the flow introduced into the nasal cannula to provide a CO₂ concentration to the nasal inserts of below approximately 0.5%